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TECHNICAL SERIES, No. 23, PART I.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.
L. O. HOWARD, Entomologist and Chief of Bureau.

MISCELLANEOUS PAPERS.

SOME NEW CALIFORNIA AND GEORGIA THYSANOPTERA.

BY

PAUL R. JONES,
Entomological Assistant, Deciduous Fruit Insect Investigations.

ISSUED JANUARY 26, 1912.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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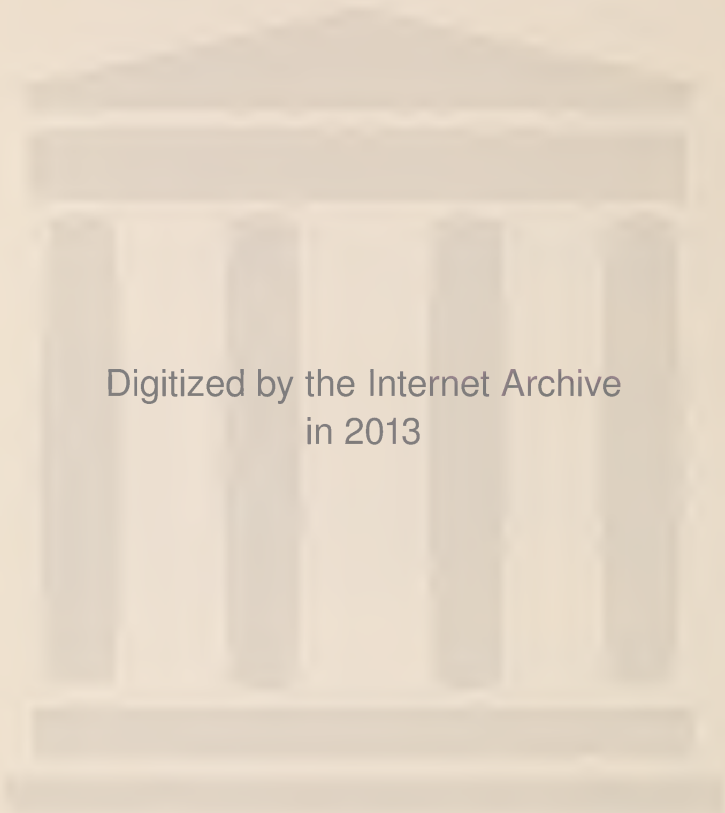
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U. S. D. A., B. E. Tech. Ser. 23, Pt. I. Issued January 26, 1912

MISCELLANEOUS PAPERS.

SOME NEW CALIFORNIA AND GEORGIA THYSANOPTERA.

By Paul R. Jones,
Entomological Assistant, Deciduous Fruit Insect Investigations.

INTRODUCTION.

In the present paper Moulton's arrangement of genera has been followed and his key to North American species has been adapted to include the species herewith described. The numbers preceding the genera in the text agree with those in Moulton's paper,[1] to which the present article is supplemental, and will facilitate the use of these two publications.

4.[2] Genus ÆOLOTHRIPS Haliday.

Key to the Species.

1. Fore wings with dark cross-bands.
   - *a*. White band around abdominal segments 1 and 2; last four segments of antennæ much longer than fifth.
     - *b*. Segments 2 and 3 of abdomen white; wings with cross-veins. *Æolothrips bicolor* Hinds.
     - *b'*. Segments 1, 2, and posterior half of 3 white; wings without cross-veins. *Æolothrips vespiformis* Crawford.
   - *a'*. Without white band around first two abdominal segments; last four segments of antennæ approximately as long or a little longer than the fifth alone.
     - *b*. Last four segments of antennæ equal to the fifth alone, third segment one and one-third times as long as 1 and 2 together; wings with cross-veins. *Æolothrips fasciatus* Linnæus.
     - *b'*. Last four segments of antennæ one and one-fourth times as long as segment 5, segment 3 one and one-half times as long as 1 and 2 together; wings without cross-veins..... *Æolothrips nasturtii* new species.
2. Each fore wing with dark longitudinal band along posterior margin.
   - *a*. With veins in anterior wings normal as in most species of the genus. *Æolothrips kuwanaii* Moulton.
   - *a'*. Without veins in anterior wings..... *Æolothrips longiceps* Crawford.

Note.—In connection with the bureau's investigation of the pear thrips and the orange thrips in California during the past few years, it has appeared desirable to obtain as much information as possible on the characteristics, life histories, and food habits of related species of Thysanoptera, and as opportunity has offered observations on these insects have been made. In this way many species have been collected, some of which were found to be new to science. Mr. Moulton's paper[1] dealt with specimens obtained by him while connected with the investigation, and in the present paper Mr. Jones presents descriptions of several species which he has obtained in the course of his work during the past two years, and which have not heretofore been recognized.

A. L. Quaintance,
In Charge of Deciduous Fruit Insect Investigations.

[1] Tech. Ser. 21, Bur. Ent., U. S. Dept. Agr., 1911.

[2] The numbers preceding this and other genera are the same as those used by Moulton in his classification. (See Tech. Ser. 21, Bur. Ent., U. S. Dept. Agr.)

DESCRIPTION OF NEW SPECIES.

Æolothrips nasturtii new species. (Pl. I, figs. 1–4.)

Measurements: Head, length 0.25 mm., width 0.225 mm.; prothorax, length 0.2 mm., width 0.25 mm.; mesothorax, width 0.341 mm.; metathorax, width 0.266 mm.; abdomen, width at distal part of segment 1, 0.216 mm., width of segment 4, 0.483 mm. Antennæ: segment 1, 31μ; 2, 60μ; 3, 135μ; 4, 108μ; 5, 72μ; 6, 42μ; 7, 23μ; 8, 15μ; 9, 12μ; total length antennæ 0.50 mm. Total body length 2.10 mm.

Color uniform dark brown.

Head slightly longer than wide, sides parallel, *transversely striated above, covered with numerous small spines,* retracted within the prothorax, one spine on each outer side and one on each inner side of the antennæ near their base and *five on each side of the head. Eyes large, extending back well on the ventral side nearly one-half the length of the head,* coarsely faceted and *sparsely pilose. Ocelli* present, large, conspicuous, making an equilateral triangle, not situated far forward, the posterior ones contiguous with the inner margins of the eyes and slightly posterior to a line drawn through the middle of the eyes; four small spines on each side of the anterior ocellus. *Mouth-cone* long, bluntly rounded; maxillary palpi 3-segmented, basal joint large, apical very small. *Antennæ* 9-segmented, twice as long as the head, dark brown, concolorous with the rest of the body, except segment 2, which is light brown, and segment 3, which is lemon-yellow, shaded light brown at the tip; all segments thickly and uniformly clothed with short spines, those on segments 1 and 2 stouter; spines on segments 1, 2, 4, and 5 brown, on segment 3 and style white; sense cones inconspicuous; segment 3 one and one-half times as long as segments 1 and 2 together and more slender than the remaining segments.

Prothorax a little wider than long, only slightly larger than the head, slightly emarginate near the center on each side, clothed with a number of short spines above. *Mesothorax* largest, one and one-third times as wide as the prothorax, broadly rounded anteriorly. *Metathorax abruptly narrower than the mesothorax,* slightly wider than prothorax, edges parallel. *Legs* uniformly dark brown; front femora slightly thickened; tibiæ armed at the tip with two strong spines, those on hind tibiæ strongest; each fore-tarsus armed with a long, stout hook and a tooth; all the legs thickly set with small spines, giving them a pitted appearance. *Wings reaching to posterior margin of sixth abdominal segment,* broadly rounded at tip. No cross-veins present; two longitudinal veins uniting with ring-vein at tip; a *large* clear area at the base, *a similar clear area* a little past the middle, and a smaller area at the tip. *Right fore wing:* Anterior longitudinal vein, *one spine on distal part of basal clear area, five spines between*

basal and central clear areas, one spine on basal part and one on distal part of central clear area, four spines between central and apical clear areas, none on apical clear area; posterior longitudinal vein, *no spines on basal clear area, five spines between basal and central clear areas, one spine on basal and one on distal part of central clear area, five spines between central and apical clear areas, none on apical clear area. Left fore wing:* Anterior longitudinal vein, one spine on distal part of basal clear area, five spines between basal and central clear areas, none on central clear area, four spines between central and apical clear areas, last one on edge of apical clear area; posterior vein, no spines on basal clear area, four spines between basal and central clear areas, one spine on basal part and one on distal part of central clear area, five spines between central and apical clear areas, none on apical clear area. All spines on white areas nearly inconspicuous. *About 37 spines on anterior margin of fore wings,* nearly inconspicuous on the clear areas. Fore wings light brown except above-mentioned clear areas; microscopic hairs on dark areas brown, on clear areas white and inconspicuous; posterior margin with a long, simple fringe. Hind wings white; *anterior margin with a short, spine-like fringe;* posterior margin with a long, simple fringe.

Abdomen uniform brown, *elongate-ovate,* narrow at base, gradually *becoming wider until segment 4, which is equally as wide as the segments 5, 6, and 7,* gradually tapering from segment 7. Segments 1 to 8 without conspicuous hairs or spines except two short, curved spines on each side of segment 7, and two on each side of segment 8 near the posterior margin; segment 9 with a circlet of about eight long spines, several smaller spines near the posterior margin; segment 10 with a circlet of about six long spines near the middle; last three segments forming a sheath for the upturned ovipositor.

Described from one female specimen taken on flowers of watercress (*Nasturtium officinale*) at San Jose, Cal., May 23, 1910 (P. R. Jones).

Near *A. vespiformis* Crawford, but differing in the italicized characters.

7. Genus THRIPS Linnæus.

KEY TO THE SPECIES.

1. Head considerably wider than long.
   - *a.* Body color dark brown, thorax and other parts orange-tinted, inner crescents bordering ocelli orange-red. Individuals large, about 1.25 mm. in length.
     - *b.* Wings light brown, with lighter colored area near base. *Thrips madronii* Moulton.
     - *b'.* Wings uniform dark brown to brown..... *Thrips magnus* Moulton.

a'. Body color light yellow to light brown or brown, inner crescents bordering ocelli light brown; body length about 1 mm.

b. Ocelli subapproximate; posterior longitudinal vein of fore wing with about fourteen to seventeen regularly placed spines.

Thrips tabaci Lindeman.

b'. Ocelli widely separated, anterior one on front and directed forward; posterior longitudinal vein bearing about seven spines.

Thrips abdominalis Crawford.

2. Head about as long as wide.

a. Head much smaller than prothorax, one-half as wide as prothorax; fore femora and tibiæ greatly enlarged..... *Thrips femoralis* new species.

a'. Head only slightly smaller than prothorax, about five-sixths as wide as prothorax; fore femora and tibiæ only slightly enlarged.

b. Color uniform light lemon-yellow..... *Thrips bremnerii* Moulton.

b'. Color of head brown, thorax reddish orange-brown, abdomen pale yellow to gray-brown..... *Thrips perplexus* Beach.

DESCRIPTION OF NEW SPECIES.

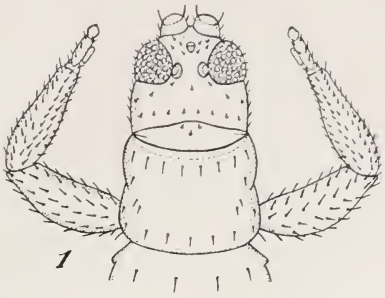
Thrips femoralis new species. (Pl. I, figs. 5–8.)

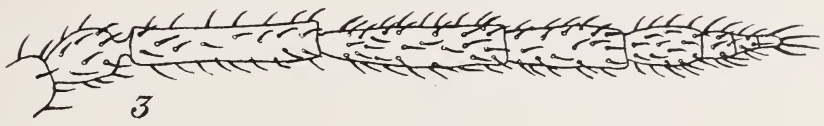
Measurements: Head, length 0.10 mm., width 0.108 mm.; prothorax, length 0.15 mm., width 0.216 mm.; mesothorax, width 0.266 mm.; abdomen, width 0.283 mm. Antennæ: Segment 1, 21μ; 2, 30μ; 3, 36μ; 4, 36μ; 5, 27μ; 6, 45μ; 7, 21μ; total length antennæ 0.216 mm. Total body length 1.31 mm.

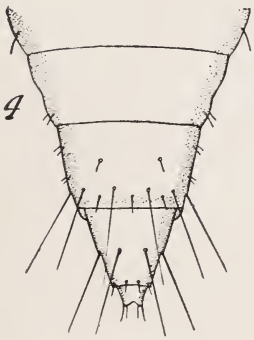
Color of body light grayish brown; head, prothorax, metathorax, and tip of abdomen darker.

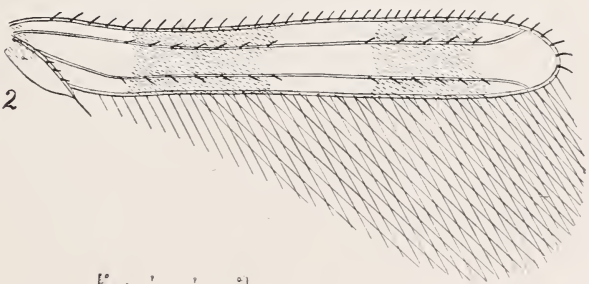
Head about as wide as long, very much smaller than prothorax, rounded in front, retracted slightly into prothorax; sides nearly straight; cheeks straight, not arched; back of head transversely striate. A small spine on each side of the anterior ocellus, and four behind each posterior ocellus. *Eyes* large, occupying more than two-thirds the width of head; facets large, inner row light colored, not protruding, sparsely pilose. *Ocelli* subapproximate, situated far backward, posterior ocelli nearly on level with the posterior margin of the eyes. Ocelli yellowish brown with dark-red crescents. *Mouth cone* long, reaching slightly past the middle of the prosternum; maxillary palpi 3-segmented; labial palpi 2-segmented. *Antennæ* 7-segmented, about two and one-tenth times as long as head, uniform light gray-brown except segment 3 and base of segments 4 and 5, which are lighter; base of segment 4 and segment 5 constricted into a broad handle, segment 3 into a longer, narrower handle; a forked sense-cone on the dorsal side of segment 3, one on the ventral side of segment 4, and a long simple sense cone on the lateral side of segment 6.

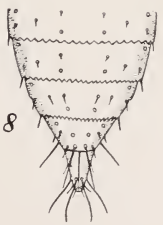
Prothorax very much larger than the head, one and one-half times as long and twice as wide, all angles rounded; two long spines on each posterior angle and two nearly as long on posterior margin near the

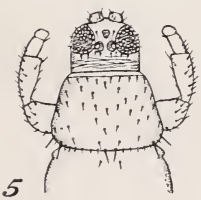


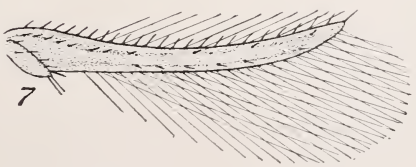












ÆOLOTHRIPS AND THRIPS.

Fig. 1.—*Æolothrips nasturtii:* Head and prothorax of female. Fig. 2.—*Æolothrips nasturtii:* Right forewing of female. Fig. 3.—*Æolothrips nasturtii:* Right antenna of female. Fig. 4.—*Æolothrips nasturtii:* End of abdomen of female. Fig. 5.—*Thrips femoralis:* Head and prothorax of female. Fig. 6.—*Thrips femoralis:* Left antenna of female. Fig. 7.—*Thrips femoralis:* Right forewing of female. Fig. 8.—*Thrips femoralis:* End of abdomen of female. Enlarged. (Original.)

middle; rest of posterior margin set with small spines and whole dorsum of prothorax with numerous slightly longer spines. *Mesothorax* largest, sides of *pterothorax* broadly rounded. *Legs* stout, fore femora and tibiæ greatly enlarged, remaining femora and tibiæ somewhat enlarged. Color of legs brown, fore tibiæ, tips of middle tibiæ, and fore and middle tarsi light yellowish brown. All tibiæ armed with spines. *Wings* present, fore wings large, uniform gray-brown, with spines arranged as follows: Costa with twenty-four; fore longitudinal vein with eight spines at base in groups of five, two, and one, with three scattered spines on apical half of wings; hind vein with six spines, the apical one separated from the rest. *Abdomen* stout, elongate-oval; segments 4, 5, and 6 largest; posterior margin of segments 1 to 7 with distinct sharp serrations, more distinct on apical segments; segment 8 with longer and sharper teeth. Almost no spines on abdomen except on last two anal segments. Segment 10 split above.

Described from two female specimens taken on goldenrod (*Solidago* sp.) at Barnesville, Ga., Aug. 22, 1910. (E. L. Jenne.)

11. Genus SERICOTHRIPS Haliday.

KEY TO THE SPECIES.

1. Wings fully developed or rudimentary.
   - *a*. Wings fully developed.
     - *b*. Fore wings white, no dark cross-bands or shading; general color white. *Sericothrips albus* new species.
     - *b′*. Fore wings dusky or gray-brown and more or less distinctly marked with whitish cross-bands; general color yellowish dusky-gray. *Sericothrips variabilis* Beach.
     - *b″*. Fore wings white, with gray cross-bands; head black; prothorax light yellow-brown; pterothorax black; tip of abdomen black; general color blackish..... *Sericothrips moultoni* new species.
     - *b‴*. Fore wings black, with two broad white cross-bands and white at tip; head black; prothorax black; pterothorax somewhat lighter; general color blackish..... *Sericothrips pulchellus* Hood.
   - *a′*. Wings reduced or fully developed; body dark brown to nearly black, except segments 4, 5, and 6 of abdomen, which are almost white. *Sericothrips cingulatus* Hinds.
2. Wings wanting.
   - *a*. Body very dark brown, nearly black; pterothorax yellow to yellow-brown; legs brown..... *Sericothrips apteris* Daniel.
   - *a′*. Body uniform brown; surface of body strongly reticulated; legs yellow. *Sericothrips reticulatus* Moulton.
   - *a″*. Body and legs uniform brown; four stout spines on the dorsal side of segment 9. *Sericothrips stanfordii* Moulton.

DESCRIPTION OF NEW FORMS AND SPECIES.

Sericothrips apteris Daniel, male. (Pl. II, fig. 1.)

Length 1 mm. Similar to female except that it is usually lighter in color; legs light brown; usually the abdomen, except the last two segments, uniform dark brown; the basal two and the apical two segments sometimes light brown similar to the pterothorax. Segment 9 of abdomen with two very stout, bluntly-pointed, black spines upon the middle above, standing close together.

Described from five specimens collected on grass and weeds during March, April, and June, at San Jose, Cal. (P. R. Jones).

This is a very variable species and I have one specimen with the head dark brown and the remainder of the body uniform light brown.

Sericothrips albus new species. (Pl. II, figs. 2–5.)

Measurements: Head, length 0.1 mm., width 0.18 mm.; prothorax, length 0.13 mm., width 0.23 mm.; mesothorax, width 0.33 mm.; abdomen, length 0.78 mm., width 0.30 mm. Antennæ: Segment 1, 21 μ; 2, 36 μ; 3, 45 μ; 4, 45 μ; 5, 45 μ; 6, 57 μ; 7, 12 μ; 8, 18 μ; total length of antennæ 0.29 mm. Total body length 1.25 mm.

General color very pale, transparent white, devoid of any dark marking, except eyes, ocelli, mouthparts, apical joints of antennæ, and spot upon tarsi.

Head nearly twice as wide as long, retracted within the prothorax, considerably depressed in front where the antennæ are received; cheeks full, converging posteriorly. *Eyes* large, protruding a little, nearly black, coarsely faceted, pilose. *Ocelli* approximate, situated upon a slight raised area between the eyes, very light yellow, with dark reddish-brown crescents; posterior ocelli not contiguous with inner margins of eyes. Spines upon head inconspicuous, but one short, curved spine on each side of fore-ocellus, and two similarly curved spines across the front; sides with several short spines and a number of very small microscopic hairs. *Mouth-cone* very long, tipped with black, extending past posterior margin of prosternum a considerable distance upon the mesosternum. Maxillary palpi slender, three-segmented. *Antennæ* about three times as long as head, well separated by the projection of the head; segment 1 short and thick; segment 2 wider than 1; segments 3 and 4 fusiform; segment 5 fusiform at base, broad at apex where it joins segment 6; segment 6 tapering gradually from base with style to tip of antennæ. Color of antennæ pale transparent white except apex of segments 4 and 5, and segments 6, 7, and 8 which are entirely gray; a forked sense-cone on segments 3 and 4.

Prothorax slightly more than twice as wide as long, angles rounded, striated transversely upon dorsum; one short spine on each anterior angle, and one upon each posterior angle. *Pterothorax* large, about

one and one-half times as wide as prothorax, *mesothorax* slightly wider than *metathorax*. *Legs* everywhere transparent white, except dark spot near apex of each tarsus. *Wings* present, reaching to tip of abdomen, transparent white, similar to rest of body. About twenty-four to twenty-six spines upon the costa; about twenty-two on fore vein; one near base and one near apex of wing where hind veins should be. No fringe on anterior margin.

Abdomen cylindrical, tapering sharply from segment 8, thickly clothed with minute white hairs which appear as a fringe upon the posterior margins of the segments. Spines upon segments 1 to 8 weak and inconspicuous; a row of long white spines upon the dorsum of segment 9 near posterior margin, and a similar row on segment 10 near middle of dorsum.

Described from three females taken in May, 1910, at Visalia, Cal., from blossoms of elderberry (*Sambucus* sp.) and from weeds (P. R. Jones).

Structurally, this species is very close to *S. variabilis* Beach. It differs, however, in several details and shows such a constant difference in coloration that I believe it to be a good species.

Sericothrips moultoni new species, female. (Pl. II, figs. 6–9.)

Measurements: Head, length 0.1 mm., width 0.2 mm.; prothorax, length 0.166 mm., width 0.266 mm.; mesothorax, width 0.333 mm.; abdomen, length 0.90 mm., width 0.366 mm. Antennæ: Segment 1, 18 μ; 2, 45 μ; 3, 70 μ; 4, 60 μ; 5, 48 μ; 6, 54 μ; 7, 15 μ; 8, 18 μ; total length of antennæ 0.32 mm. Total length of body 1.35 mm.

Color dark brownish black. Similar to *S. variabilis* Beach, but differing from it as follows:

Head one-half as long as wide, uniformly brownish black. Segments 1, 2, and 3 of the antennæ very light yellowish brown; segments 4 and 5 apically, segments 6, 7, and 8 entirely, grayish brown; a pair of small spines near the inner and outer posterior margins of each eye.

Prothorax not concolorous with head, light yellowish brown, less than one-half as long as wide. *Pterothorax* brownish black, *mesothorax* slightly wider than *metathorax*. Posterior femora uniformly dark brown, except an area at the base. *Fore wings* transparent white, except a small grayish-brown area at base, and one cross-band of similar color about one-third the distance of the wing from the base. About twenty-six spines on costa; about twenty-two spines on fore vein; usually no spines where hind vein should be, but sometimes one spine present near apex of wing.

Abdomen: Segments 1, 2, 7, 8, 9, and 10 brownish black; intermediate segments light yellowish-brown with the anterior margins brownish black, varying in extent. Segments clothed with numerous fine hairs, appearing as a fringe on the posterior margins. Segment

2 often, 7 usually about one-half as long as the remaining segments of the abdomen.

Male: Length about 1.08 mm.; coloration similar to that of female.

Described from numerous specimens, both male and female.

Living specimens, when viewed under a hand lens, appear to be velvety black upon the *head, pterothorax,* and *tip of the abdomen.*

This species was very abundant in 1910, from April to October, upon one plant of a large perennial lupine near San Jose, Cal., and is very active in flying and leaping (P. R. Jones).

The larvæ were abundant also and these, together with the adults, were so numerous as to completely ruin the foliage of the above plant. Very few specimens were in the flowers.

Named for Mr. Dudley Moulton in recognition of his very valuable work on American Thysanoptera.

13. Genus LIMOTHRIPS Haliday.

KEY TO THE SPECIES.

1. Segment 2 of antennæ drawn out into a prominent, acute, triangular process on the outer angle ..... *Limothrips setariæ* new species.
2. Segment 2 of the antennæ simple ..... *Limothrips cerealium* Haliday. (Synonym, *L. avenæ* Hinds.)

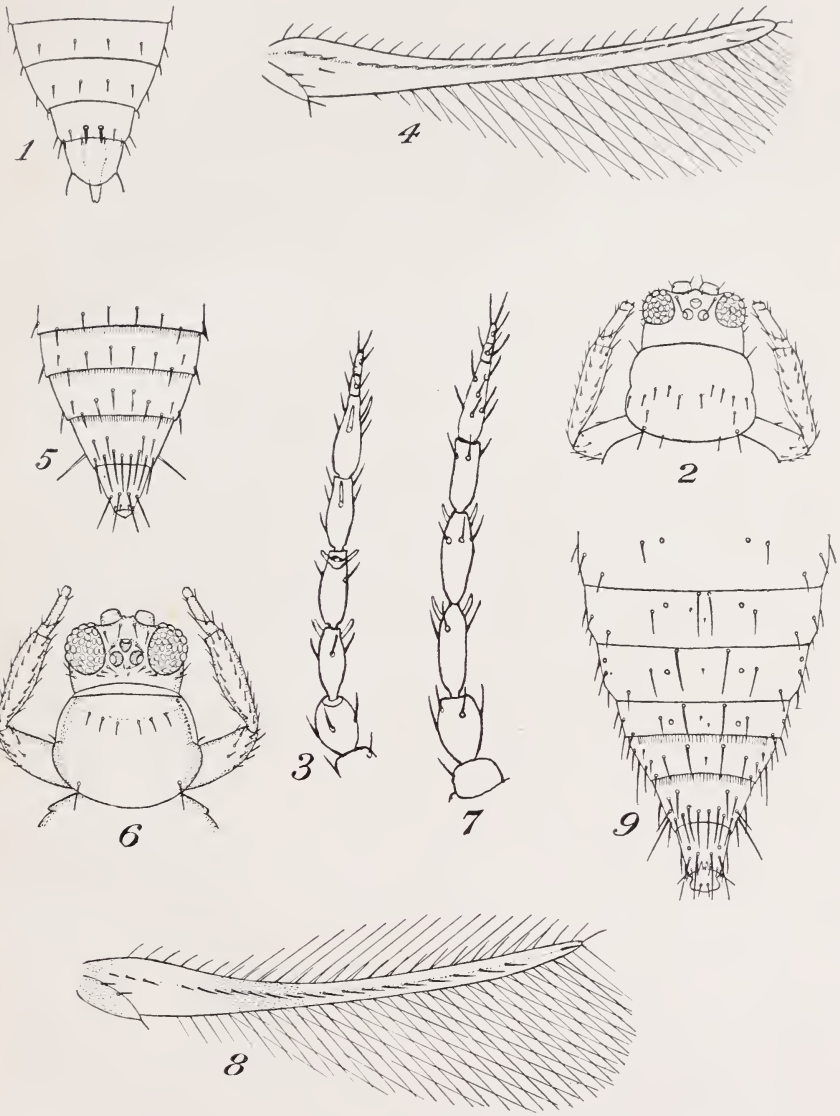
DESCRIPTION OF NEW SPECIES.

Limothrips setariæ new species, female. (Pl. III, figs. 1–5.)

Measurements: Head, length 0.216 mm., width at eyes 0.166 mm., width at back of head 0.2 mm.; prothorax, length 0.183 mm., width 0.233 mm.; mesothorax, width 0.333 mm.; abdomen, width 0.35 mm.; total length of body 2.116 mm. Antennæ: Segment 1, 18μ; 2, 45μ; 3, 51μ; 4, 45μ; 5, 48μ; 6, 60μ; 7, 12μ; 8, 18μ; total length of antennæ 0.30 mm.

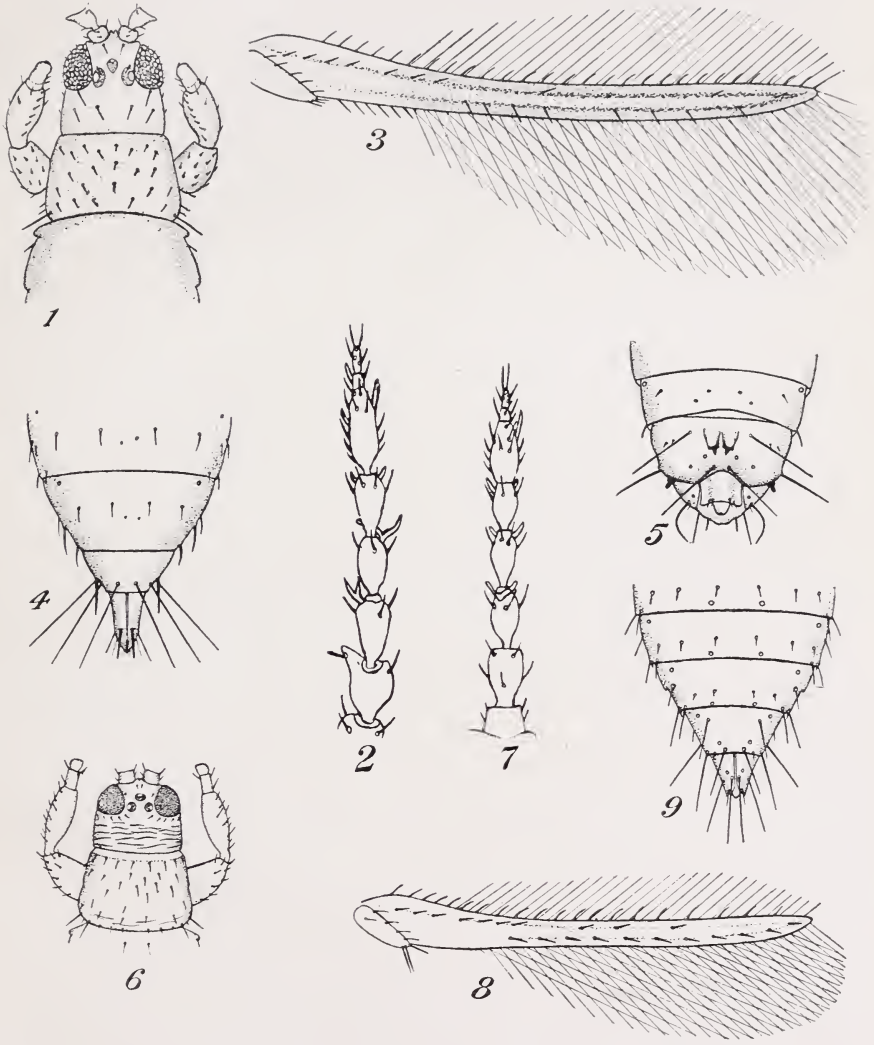
Color dark yellowish brown, ends of tibiæ and tarsi lighter.

Head slightly longer than wide, diverging posteriorly; cheeks very slightly arched; back of head scarcely striated at all; a pair of spines in front of anterior ocellus, one in front of each posterior ocellus, one posterior to each eye, and a row of four spines midway between base of eyes and posterior margin. Front strongly produced anteriorly, considerably so between the bases of the antennæ. *Eyes* moderately prominent, black, with yellow borders, protruding slightly, coarsely faceted, not pilose. *Ocelli* well separated, anterior one smallest, posterior ones contiguous with inner margins of the eyes; brownish yellow, with dark-brown crescents; not situated far forward. *Mouth-cone* obtusely pointed, extending past middle of prosternum; maxillary palpi short, 3-segmented. *Antennæ* 8-segmented, about one and one-half times as long as the head, slender, uniformly dark brown except segments 2, 3, and 4, which are slightly lighter. Segment 1 very short and thick; 2 *large, drawn out into an acute triangular*



SERICOTHRIPS.

Fig. 1.—*Sericothrips apteris:* End of abdomen of male. Fig. 2.—*Sericothrips albus:* Head and prothorax of female. Fig. 3.—*Sericothrips albus:* Right antenna of female. Fig. 4.—*Sericothrips albus:* Right forewing of female. Fig. 5.—*Sericothrips albus:* End of abdomen of female. Fig. 6.—*Sericothrips moultoni:* Head and prothorax of female. Fig. 7.—*Sericothrips moultoni:* Right antenna of female. Fig. 8.—*Sericothrips moultoni:* Right forewing of female. Fig. 9.—*Sericothrips moultoni:* End of abdomen of female. Enlarged. (Original.)



LIMOTHRIPS AND EUTHRIPS.

Fig. 1.—*Limothrips setariæ:* Head and prothorax of female. Fig. 2.—*Limothrips setariæ:* Left antenna of female. Fig. 3.—*Limothrips setariæ:* Right forewing of female. Fig. 4.—*Limothrips setariæ:* End of abdomen of female. Fig. 5.—*Limothrips setariæ:* End of abdomen of male. Fig. 6.—*Euthrips longirostrum:* Head and prothorax of female. Fig. 7.—*Euthrips longirostrum:* Left antenna of female. Fig. 8. *Euthrips longirostrum:* Right forewing of female. Fig. 9.—*Euthrips longirostrum:* End of abdomen of female. Enlarged. (Original.)

process at the outer angle; 3 and 4 fusiform; 5 clavate; 6 fusiform; 7 and 8 slender, cylindrical. A forked sense cone on outer side of segment 3, a similar one on inner side of segment 4, and similar ones on ventral side of segments 5 and 6; all other sense cones simple, short, slender, and inconspicuous.

Prothorax a little shorter than the head, one and one-third times wider than long, diverging from the head posteriorly; one prominent spine on each posterior angle, the other spines short and inconspicuous; sides slightly rounded. *Mesothorax nearly twice as wide as the prothorax; metathorax* abruptly narrower. *Legs* uniform brown, except fore tibiæ, ends of tibiæ, and tarsi, which are brownish yellow; legs moderately long, hind tibiæ alone bearing a fringe of stout spines. *Wings* present, long and slender, *about fifteen times as long as the width in the middle.* Two longitudinal veins in fore wing, branching at about one-fourth its length. Both veins and costa bearing a few short dark brown spines; *costa with about twenty-five to twenty-eight; fore veins with about ten, only three beyond the middle; hind vein with eight more or less regularly placed spines.* Fore wings dark smoky gray; hind wings slightly gray; costal fringes long and prominent.

Abdomen about two-thirds length of body, about as wide as long. Spines on abdomen weak and inconspicuous before segment 7; segment 8 bearing on each side three or four stout, curved, dark-brown spines; segment 9 bearing a circlet of long slender spines and *two very stout spines, one on each latero-posterior edge on the dorsum just in advance of the circlet of spines.* Segment 10 split open above, sharply pointed, and on each side above with a short, very stout, straight, dark-brown spine, reaching slightly beyond the tip. Abdomen yellowish brown, darker toward tip, connective tissue pale yellow.

Described from numerous long-winged females taken on green foxtail grass (*Setaria viridis*), wild oats, and California buckeye (*Æsculus californica*), San Jose, Cal., June-July, 1910 (P. R. Jones).

Near *Limothrips avenæ* Hinds (=*cerealium* Haliday, according to Bagnall) but differing in the italicized characters.

Male: Head, length 0.116 mm., width 0.2 mm.; antennæ, length 0.258 mm.; prothorax, length 0.166 mm.; prothorax, width 0.25 mm.; mesothorax, width 0.175 mm.; abdomen, width 0.341 mm.; total length 1.366 mm.

Color brownish yellow, head grayish brown. Head one and one-half times as wide as long, ocelli wanting, only vestiges remaining in some specimens. *Mouth-cone* longer than in female, extending nearly to posterior margin of the prosternum. *Antennæ* stout, a little more than twice as long as the head, process on second joint not so acute as in the female. *Prothorax* a little longer than the head, one and one-third times as broad as long. No vestiges of wings. *Abdomen* about two and one-half times as long as broad, bluntly rounded;

segment 9 large, bluntly conical; segment 10 small, retracted within 9. Close together on the middle of the dorsum of segment 9 stand two short, very stout spines borne upon broader, black, chitinous projections, the inner and outer edges of which are parallel; on each side of the projections is a long, slender spine; on the latero-posterior edge of segment 9 on each side is another chitinous, black projection supporting a stout, black spine; a much longer, slender, curved spine on each side of segment 9 about one-fourth of the distance from the posterior margin; two long, slender spines projecting on each side of segment 10 from underneath. Segment 9 cut out above over about one-half of segment 10.

Described from six specimens.

18. Genus EUTHRIPS Targioni-Tozzeti.

KEY TO THE SPECIES.

1. Without prominent spines on fore-angles of prothorax, longitudinal veins not regularly set with spines.
   a. Head noticeably wider than long; general color white to light yellow or orange.
      b. Last two segments of antennæ rather long and slender, and together about two-thirds as long as segment 6; wings shaded brown, with transparent whitish areas near base and at tip; ring-vein and longitudinal veins not conspicuous.
      Euthrips orchidii Moulton.
      b′. Last two segements of antennæ not noticeably elongate and slender and together about one-half as long as segment 6.
         c. Ring-vein and at least part of fore-vein conspicuous.
            d. Body color translucent white to yellowish white; spines on costa of fore-wings unusually long; ring vein and both longitudinal veins conspicuous; segments 3 and 4 of antennæ pedicellate; wings shaded dilute yellow.
            Euthrips costalis new species.
            d′. Body color orange-yellow; spines on costa of fore-wings not unusually long; segements 3 and 4 of antennæ not pedicellate.
               e. Wings shaded brown, fore-part of longitudinal vein alone conspicuous.....*Euthrips longipennis* Bagnall.
               e′. Wings not shaded brown; both longitudinal veins present, with three or four scattered spines on each, one of which stands at the abrupt ending of each vein.
               Euthrips citri Moulton.
         c′. Ring vein and longitudinal veins not conspicuous; group of six spines on basal part of wing where anterior vein should be and nine on outer half where posterior vein should be; color of body and wings clear white, outer half of antennæ dark brown.....*Euthrips albus* Moulton.
   a′. Head about as long as wide or a little wider (except *Euthrips longirostrum*, which is noticeably wider than long); general color brown, thorax sometimes orange-brown and yellow-brown.
      b. Eyes pilose; no postocular spines; two long, prominent spines between posterior ocelli; segments 3 and 4 of antennæ not pedicellate; fore-wings with transparent area near base; hind longitudinal vein of fore-wings with about sixteen spines.
      Euthrips pyri Daniel.

b'. Eyes not pilose; postocular spines present; a prominent spine in front of each posterior ocellus, segments 3 and 4 of antennæ not pedicellate; fore-wings without transparent area near base; hind longitudinal vein of fore-wings with about thirteen spines.....*Euthrips ehrhornii* Moulton.

b''. Eyes not pilose; postocular spines absent; no prominent spines in front of or between posterior ocelli; segments 3 and 4 of antennæ pedicellate; fore-wings without transparent area near base; hind longitudinal vein of fore-wings with about ten spines; mouth-cone very long...*Euthrips longirostrum* new species.

2. With spines on fore-angle of prothorax; longitudinal veins on fore-wings set regularly with spines.

a. Fore tibiæ armed at end with tooth. Females dark brown, wings brown with whitened area near base; antennæ concolorous with head except segment 3, which is light yellow.
Euthrips ulicis californicus Moulton.

a'. Fore tibiæ not armed with tooth.

b. Postocular spines wanting; row of spines along anterior margin of prothorax either wanting or at least not conspicuous except often the third from the outer margin.

c. Antennæ uniformly brown to dark brown, concolorous with body; wings light yellow-brown, veins prominent; spines brown, twenty-three on fore vein, sixteen on hind vein, short and moderately stout; white longitudinal area near base of wing.
Euthrips minutus Moulton.

c'. Antennæ with segment 3 yellowish; segments 3 and 4 light gray-brown, yellowish at base; wings gray-brown, veins not prominent, spines on wings normally long and stout, fourteen on fore vein, ten on hind vein (wings may be reduced to pads).....*Euthrips fuscus* Hinds.

b'. Postocular spines conspicuous.

(1.) General color uniformly brown to dark brown, no shading of orange. Antennæ with segments 3, 4, and 5 light brown to yellow and shaded.

a. Uniformly dark brown, fore-wings shaded dark brown, with a large whitened area extending across wing near base; spines on wings all dark brown.....*Euthrips insularis* Franklin.

a'. Color yellowish brown, fore-wings uniformly shaded with gray.
Euthrips nervosus Uzel.

(2.) General color whitish to yellow or yellowish to brown, no shading of orange.

a. Segment 2 of antennæ with a double spine-bearing tubercule; vertex of head depressed and anterior ocellus directed forward.

b. Color uniformly yellow, surface of body without reticulation.
Euthrips cephalicus Crawford.

b'. Color uniformly brown; surface of body reticulated.
Euthrips cephalicus var. *reticulatus* Crawford.

a'. Segment 2 of antennæ without double spine-bearing tubercule; vertex of head not depressed; anterior ocellus directed upward; color yellowish shaded with dusky brown.
Euthrips helianthi Moulton.

(3.) General color light yellow to yellowish brown, thorax or other parts decidedly tinted with orange.

a. Head pale lemon-yellow to light yellowish brown; thorax orange-yellow; abdomen brownish yellow to brown; segement 1 of antennæ whitish to light brown; segment 2 dark brown. *Euthrips occidentalis* Pergande.

a′. General color brownish yellow, not uniform, thorax orange yellow, segment 1 of antenna pale yellow, 2 light brown, base sometimes yellowish.....*Euthrips tritici* Fitch.

a″. General color brown to dark brown, thorax orange-brown. *Euthrips tritici* var. *californicus* Moulton.

DESCRIPTION OF NEW FORMS AND SPECIES.

Euthrips ehrhornii Moulton, male.

Measurements: Head, length 0.15 mm., width 0.2 mm.; prothorax, length 0.166 mm., width 0.183 mm.; mesothorax, width 0.2 mm.; abdomen, width 0.25 mm.; total body length 1.4 mm.

General color similar to female, light brown, head lighter than rest of body.

Antennæ light gray-brown; segments 1 and 3, base and apex of segment 4, and apex of segment 5, brownish white. *Legs* very light brown, trochanters and underside of all the legs nearly white. *Wings* fully developed, nearly transparent white, lightly tinged with grayish-brown; veins weak; spines on wings not so prominent as in the female, arranged as those in female except that there are five on scale of wing and four scattering spines on distal part of fore vein.

Described from one male taken April 9, 1910, from flowers of large, bushy perennial lupine at San Jose, Cal. (P. R. Jones).

Female, *forma brachyptera:* Similar to *forma macroptera* except larger and longer (1.9 mm. in length); general color darker brown, head not lighter; antennæ similar in color to rest of body, apex of segments 3, 4, and 5, white; head longer than wide, a row of spines on head across the front; wings short, extending to base of abdomen; trochanters similar in color to rest of body; abdomen large in proportion to rest of body, segment 10 split above.

Described from two brachypterous females taken from wild flowers March 31, 1910, at San Jose, Cal. (P. R. Jones).

This species is very close to *Euthrips pyri* Daniel, and is evidently quite variable.

Euthrips longirostrum new species. (Pl. III, figs. 6–9.)

Measurements: Head, length 0.10 mm., width 0.133 mm.; prothorax, length 0.15 mm., width 0.183 mm.; mesothorax, width 0.25 mm.; abdomen, width 0.30 mm. Antennæ: Segment 1, 24μ; 2, 42μ; 3, 48μ; 4, 48μ; 5, 36μ; 6, 48μ; 7, 11μ, 8, 15μ; total length of antennæ 0.267 mm. Total body length 1.08–1.40 mm.

Color of body, brown; head, thorax, legs, and antennæ tinged with yellow.

Head about one and one-third times as wide as long, rounded in front, retracted considerably within the prothorax; cheeks slightly arched; back of head transversely striate, bearing five small spines in a row posterior to each eye; also one on each side and two in front of anterior ocellus. *Eyes* prominent, oval in outline, black, with light borders, finely faceted, not pilose. *Ocelli* subapproximate, light yellow, with reddish brown crescents. *Mouth-cone* very long, pointed, *reaching to middle of mesosternum*, tipped with black; maxillary palpi large, long, 3-segmented, middle segment shortest; labial palpi 2-segmented. *Antennæ* 8-segmented, nearly two and four-fifths times as long as head, uniform light-yellowish gray-brown, except segments 1 and 3, which are lighter, and apex and base of segment 3 broadly, base of segment 4, and segment 5, which are transparent white; segment 3 with a distinct handle, segments 2, 4, and 5 constricted somewhat at the base; a forked sense-cone on dorsal side of segment 3, a similar one on ventral side of segment 4, a short, simple sense-cone on lateral side of segment 5, near apex; spines pale brown.

Prothorax slightly wider than long, one and one-half times as long as head; a very small, weak spine at each anterior angle, two strong ones at each posterior angle, a row of short spines on the posterior margin, and a number on the dorsum. *Mesothorax* largest, angles rounded. *Legs* long, lighter than body, dilute yellowish gray-brown, femora darker; in some specimens the legs are yellowish-white, hind femora darker. Spines at tip of fore and middle tibiæ weak; several strong spines at apex of hind tibiæ. *Wings* present, yellowish-white. Veins usually indistinct and tending to disintegrate in mounted specimens. Wings sometimes extending past tip of abdomen, but usually shorter in proportion to abdomen. Spines arranged as follows: Costa with 21 spines, fore longitudinal vein with eleven spines, seven on basal half of wing, three in one group, four in the other, and four scattered spines on apical half, one of which is near apex; hind longitudinal vein with ten regularly placed spines beginning where basal group ends on fore longitudinal vein.

Abdomen subovate, tapering quite suddenly from segment 7. A number of long, stout spines on last three segments. Last segment split above on dorsum.

Described from four females taken from flowers of a perennial lupine, Los Gatos, Cal., May, 1910 (P. R. Jones). Male unknown.

Euthrips costalis new species. (Pl. IV, figs. 1–4.)

Measurements: Head, length 0.10 mm., width 0.166 mm.; prothorax, length 0.11 mm., width 0.183 mm.; mesothorax, width 0.283 mm.; abdomen, width 0.316 mm. Antennæ: Segment 1, 27 μ; 2, 36 μ; 3, 48 μ; 4, 45 μ; 5, 36 μ; 6, 51 μ; 7, 9 μ; 8, 12 μ; total length of antennæ 0.264 mm. Total body length 1.33 mm.

Color of body very dilute yellowish-white, segments 4 to 8 of antennæ grayish brown.

Head angular in front, depressed to receive basal segments of antennæ; sides straight, about one and one-third times as wide as long; spines on head inconspicuous, except one on inner side of each posterior ocellus. *Eyes* large, black, not protruding, slightly pilose; facets large. *Ocelli* approximate, yellow, with brownish-red crescents. *Mouth-cone* short, blunt, tipped with black; maxillary palpi 3-segmented; labial palpi 2-segmented. *Antennæ* 8-segmented, slender, about two and three-fifths times as long as the head; segments 3 and 4 distinctly constricted into a handle at the base. Color of segments 1, 2, and 3 white, faintly tinged with yellow, outer half of segment 3 darker; remaining segments grayish brown, except apices, which are transparent white. A forked sense-cone on dorsal side of segment 3, a similar one on ventral side of segment 4, and two simple sense-cones on each side of segments 5 and 6, near apex. Spines pale and inconspicuous.

Prothorax only a little wider than the head, constricted in the middle; two long, prominent spines on each posterior angle, no visible spines on posterior margin, but four or five short, slender, inconspicuous spines on lateral margins extending to anterior angles. *Mesothorax* largest, sides of *pterothorax* broadly and evenly rounded. *Legs* long and slender, concolorous with body, very light yellowish-white; spines on hind tibiæ alone visible. *Wings* present; forewings broadest at basal third, pointed at ends, all veins conspicuous to end of wings. Spines arranged as follows: *Costa with about eighteen very long, strong spines, much longer than is usual in this genus;* fore longitudinal vein with eight spines, six at base and two at apex; hind longitudinal vein with eight regularly placed spines, beginning where basal group on fore vein ends; anterior fringe very light; posterior fringe long; both fringes present only on apical half of wing. Wings concolorous with body, very light yellowish white.

Abdomen long and slender; spines conspicuous only on last two segments; a comblike arrangement on posterior margin of segment 8.

Described from one female specimen from flowers of California buckeye (*Æsculus californica*), June 6, 1910, San Jose, Cal. (P. R. Jones.) Male unknown.

19. Genus ANAPHOTHRIPS Uzel.

KEY TO THE SPECIES.

1. Antennæ 9-segmented; no spines on posterior angles of prothorax; cheeks straight; surface of abdomen not faintly cross-striated; crescents of ocelli bright orange-yellow; species apparently not saltatory.
   Anaphothrips obscurus Müll. (Synonym, *A. striatus* Osborn.)
2. Antennæ 9-segmented; one stout spine on each posterior angle of prothorax; cheeks arched; crescents of ocelli light brown; species apparently not saltatory.

a. Head about as long as wide; wings not unusually long, shaded gray-brown, with small transparent area near base; segments 5, 6, 7, and 8 of abdomen without comblike arrangement of spines along posterior margin; color uniform yellow to gray-brown; segment 3 of antennæ not pedicellate.

Anaphothrips zeæ Moulton.

a'. Head noticeably wider than long; wings not unusually long, transparent; segments 5, 6, 7, and 8 of abdomen with conspicuous comblike arrangement of spines; color of head and prothorax yellowish or orange-yellow, abdomen brown; segment 3 of antennæ pedicellate.

Anaphothrips tricolor Moulton.

a''. Head noticeably wider than long; wings very long, light brown, with clear area near base; abdominal segments without comblike arrangement of spines on posterior margin of abdominal segments; color brownish yellow to yellowish white; segment 3 of antennæ pedicellate.

Anaphothrips longipennis Crawford.

3. Antennæ with 8 segments; one stout spine on each posterior angle of prothorax; head noticeably wider than long; species saltatory.

a. Color uniform yellow; first longitudinal vein with ten or eleven spines, hind longitudinal vein with three spines; ocelli subapproximate, with reddish-orange crescents; ovipositor extending past tip of abdomen; segment 3 of antennæ pedicellate....(*Scirtothrips*) *Anaphothrips ruthveni* Shull.

a'. Color translucent white, tinged yellowish brown; first longitudinal vein with nine spines, second longitudinal vein with two; ocelli approximate, crescents light brown; ovipositor not extending past tip of abdomen; segment 3 of antennæ not pedicellate..*Anaphothrips albus* new species.

The genus *Scirtothrips* was erected by Shull[1] for the species *ruthveni* on the characters "*Head is shorter than broad and shorter than prothorax, one spine of moderate length is borne by each posterior angle of the prothorax. Species of this genus have the power of springing.*"

Since then *Anaphothrips zeæ*, *A. tricolor*, and *A. longipennis* have been described and now *A. albus*, all of which have long spines on the posterior angles of the prothorax. In *A. tricolor*, *A. longipennis*, and *A. albus* the head is also noticeably wider than long, while *A. albus* possesses the power of springing; the latter also does not have an oblique division of segment 6 of the antennæ. I am positive that the last four species belong to the genus *Anaphothrips*, and if such is the case the genus *Scirtothrips* can not hold upon the characters for which it was erected.

DESCRIPTION OF NEW FORMS AND SPECIES.

Anaphothrips zeæ Moulton.

Female, *Forma brachyptera:* Length 1.53 mm. Similar to *Forma macroptera* except that it is longer and the abdomen, which is larger in proportion to the rest of the body, is much wider than the pterothorax.

Described from two specimens taken on weeds, May 21, 1910, at Visalia, Cal. (P. R. Jones).

This form of *Anaphothrips zeæ* resembles *Aptinothrips rufus* (Gmelin) superficially.

[1] Ent. News, vol 20, no. 5, p. 222, 1909.

Male: Length 1.16 mm. Similar to female, but more slender in form; antennæ one and one-half times as long as the head, more slender than in the female. Spines on wings as follows: Fore vein with a group of four regularly placed spines near the base, a second group of seven regularly placed spines, a group of two slightly distad of the middle, and two widely separated spines on the outer half; hind vein with ten more or less regularly placed spines.

Genitalia and orange-colored testes very prominent.

One specimen, taken May 21, 1910, on weeds at Visalia, Cal. (P. R. Jones).

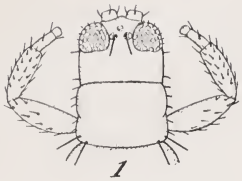
Anaphothrips albus new species. (Pl. IV, figs. 5–8.)

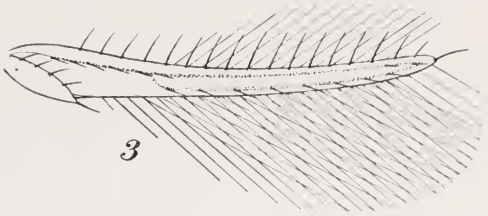
Measurements: Head, length 0.10 mm., width 0.133 mm.; prothorax, length 0.10 mm., width 0.15 mm.; mesothorax, width 0.183 mm.; abdomen, width 0.233 mm. Antennæ: Segment 1, 18μ; 2, 33μ; 3, 45μ; 4, 42μ; 5, 36μ; 6, 42μ; 7, 9μ; 8, 12μ; total length of antennæ 0.247 mm. Total length of body 1 mm.

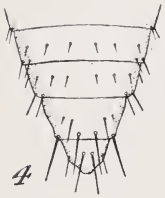
Color of body translucent white, tinged very lightly with yellowish brown, varying sometimes; head and thorax slightly darker. *Head* considerably broader than long, rectangular, without visible spines, slightly angular in front; cheeks arched. *Eyes* black, prominent, protruding, with coarse facets. *Ocelli* present, approximate, nearly contiguous; crescents light brown. *Mouth-cone* long, broad at base, pointed at tip, which is black, extending to base of prosternum. Maxillary palpi large, 3-segmented; labial palpi 2-segmented, basal segment long. *Antennæ* long, about two and one-half times as long as head, slender, 8-segmented, no oblique line dividing sixth segment; color of segments 1 and 2 very light transparent yellowish white, segment 3 lighter, apex of segment 4, apical half of segment 5, and remaining segments entirely shaded lightly with gray; a forked sense-cone in ventral side of segment 5, and a simple sense-cone on apex of segments 3, 4, 6, and 7, on lateral side.

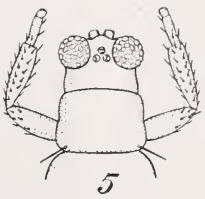
Prothorax as long as head and only slightly wider; one long, slender, transparent, nearly inconspicuous spine on each posterior angle, no other spines visible. *Mesothorax* largest, sides rounded. *Metathorax* with sides almost parallel but constricted abruptly behind. *Legs* concolorous with body but slightly lighter, hind tibiæ alone armed with spines. *Wings* present, uniformly transparent white, barely discernible. Costa with twenty-six spines; fore longitudinal vein with six spines on basal half in groups of three, then three scattered ones; apical half of wing with three widely scattered spines; hind longitudinal vein with only two widely separated spines on apical half of wing. Anterior fringe very weak, both anterior and posterior fringes not beginning until about the middle of the wing.

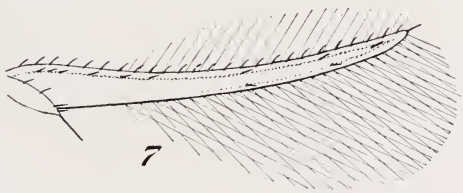
Abdomen subovate, lighter translucent white than rest of body, without pronounced spines except on terminal segments, all spines

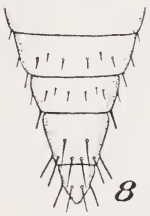












EUTHRIPS AND ANAPHOTHRIPS.

Fig. 1.—*Euthrips costalis:* Head and prothorax of female. Fig. 2.—*Euthrips costalis:* Right antenna of female. Fig. 3.—*Euthrips costalis:* Right forewing of female. Fig. 4.—*Euthrips costalis:* End of abdomen of female. Fig. 5.—*Anaphothrips albus:* Head and prothorax of female. Fig. 6.—*Anaphothrips albus:* Right antenna of female. Fig. 7.—*Anaphothrips albus:* Right forewing of female. Fig. 8.—*Anaphothrips albus:* End of abdomen of female. Enlarged. (Original.)

transparent. One specimen is more deeply tinged with yellowish brown.

Male: Length 0.833 mm. Smaller and more slender than female but similar in color; orange-colored testes prominent.

Described from two female and one male taken from monkey flower (*Mimulus* sp.) June 6, 1910, San Jose, Cal. (P. R. Jones).

Living specimens are very white and fly readily; they also have the power of springing.

24. Genus ANTHOTHRIPS Uzel.

KEY TO THE SPECIES.

1. Postocular spines wanting; antennæ almost uniformly brown except segment 2 and base of segment 4, which are light brown..*Anthothrips niger* Osborn.
2. Postocular spines well developed.
   a. Postocular spines and most of the spines on postero-lateral margin of abdominal segments knobbed.....*Anthothrips flavipes* new species.
   a'. Postocular spines and spines on postero-lateral margin of abdominal segments not knobbed.
      b. Antennæ uniformly brownish black; apex of femora with a small, anteriorly-directed, triangular tooth within..*Anthothrips nigricornis* new species.
      b'. Segments 3 and 6 of antennæ, eyes, fore tibiæ, all tarsi, and other lighter parts of body shaded with orange yellow; femora without tooth at apex.....*Anthothrips verbasci* Osborn.
      b''. Intermediate segments of antennæ and other light parts of body light brown; femora without tooth at apex..*Anthothrips variabilis* Crawford.

DESCRIPTION OF NEW SPECIES.

Anthothrips nigricornis new species. (Pl. V, figs. 1–4.)

Measurements: Head, length 0.30 mm., width 0.283 mm.; prothorax, length 0.233 mm., width 0.416 mm.; mesothorax, width 0.483 mm.; abdomen, width 0.536 mm.; length of tube 0.15 mm.; total length of body 2.383 mm. Antennæ: Segment 1, 30μ; 2, 48μ; 3, 51μ; 4, 63μ; 5, 60μ; 6, 51μ; 7, 48μ; 8, 30μ; total length of antennæ, 0.381 mm.

General color very dark brown to black with purplish pigmentation.

Head about as long as wide; cheeks nearly straight and parallel; sides of head set with a few minute spines; postocular spines prominent, blunt, but not knobbed. *Eyes* rounded, not protruding, finely and closely faceted. *Ocelli* widely separated, situated far forward, anterior one on extreme vertex; two small spines in front and one behind each posterior ocellus. *Mouth-cone* slightly longer than its breadth at the base, bluntly pointed. *Antennæ* approximate, about one and one-third times as long as the head, uniformly dark brown, segments 1 and 2 sometimes darker; spines pale and weak; three short sense-cones on segment 3 and two short ones on segment 4.

Prothorax slightly more than three-fourths as long as the head; one long, blunt spine on each posterior angle and one on posterior margin just inside of the former pair; one short spine near the anterior

angles and one on each side near lateral margin nearly equidistant between the spines on the anterior and posterior angles. Sides of *pterothorax* nearly straight, gradually tapering posteriorly, fore angles oblique. *Legs* long and moderately stout, concolorous with the body, except apex of fore tibiæ and fore tarsi, which are light brown. Fore femora greatly enlarged; all femora with a small, stout, anteriorly directed, triangular tooth at the tip within; all femora with a long spine near the base underneath. Fore coxæ with a short spine. Fore tibiæ with a long spine near the tip underneath. Fore tarsi with a small tooth near the middle within and a stout terminal claw. All legs set with numerous short spines. *Wings* extending to distal margin of sixth abdominal segment, narrowed in the middle, brownish at the base; three spines on anterior margin near the base.

Abdomen gradually tapering from the base; concolorous with the rest of the body, purple pigmentation conspicuous in unmascerated specimens; tube one-half as long as head; a few small spines on dorsum and about six weak, long spines at the tip slightly more than one-half length of the tube; a pair of long, slender, pointed spines on the latero-dorsal margin of each abdominal segment. Males similar to females, except smaller, and fore femora more greatly enlarged.

Described from numerous specimens of both sexes taken in July, August, and September, 1910, on a plant determined by Dr. E. L. Greene, of the Bureau of Plant Industry, as *Eriogonum nudum*, at Alum Rock Creek Canyon, San Jose, Cal. (P. R. Jones).

Anthothrips flavipes new species. (Pl. V, figs. 5–7.)

Measurements: Head, length 0.25 mm., width 0.233 mm.; prothorax, length 0.233 mm., width 0.366 mm.; mesothorax, width 0.40 mm.; abdomen, length 1.41 mm., width 0.444 mm.; length of tube 0.15 mm.; total length of body 2.216 mm. Antennæ: Segment 1, 24μ; 2, 48μ; 3, 57μ; 4, 60μ; 5, 48μ; 6, 45μ; 7, 51μ; 8, 30μ; total length of antennæ, 0.36 mm.

General color dark reddish brown.

Head slightly longer than wide, broadest at the base; sides nearly straight, roughened, set with minute spines; postocular spines prominent, knobbed; hind margin of the head not covered with the front margin of the prothorax. *Eyes* finely faceted, rounded, not protruding, not pilose. *Ocelli* large, well separated, posterior ones the largest, anterior one not situated on the extreme vertex; posterior ocelli contiguous with the light margins of the eyes; two small spines just behind each posterior ocellus and two about twice as far in advance of each posterior ocellus. *Mouth-cone* about as long as its width at the base, pointed. *Antennæ* approximate, about one and one-half times as long as the head, separated at the base by a prolonged vertex; color uniform dark brown except segment 3, which is light brown and yellow at the base; segments 2 and 4 slightly tinged with light brown; segment 1 short, cylindrical; segment 2

urn-shaped, with a long base; segment 3 clavate; segment 4 nearly fusiform; segments 5 and 6 more slender and less fusiform; segment 7 narrow, cylindrical; segment 8 sharply conical. Spines pale and weak; sense-cones short.

Prothorax nearly as long as the head; a stout, knobbed spine on each coxa, one on each fore angle, one in each posterior angle, and a pointed spine just inside of the knobbed ones on posterior angles. Fore coxæ large, forming apparently prominent angles. *Pterothorax* nearly as wide as the abdomen; sides nearly straight, narrowed abruptly in front, gradually behind. *Legs* stout, unicolorous with the body, *fore femora greatly enlarged;* fore tibiæ, distal portion of intermediate and posterior tibiæ, and all the tarsi lemon-yellow; a dark spot on all the tarsi near the apex within; *fore tarsi armed with a large stout tooth near the tip within. Wings* present, narrowed at the middle, fringes long, single, except hind margin of the fore wing where it is double for 10 to 12 hairs.

Abdomen broadly joined to the metathorax and but slightly wider, less than twice as wide as the head and much more than twice as long as wide; first seven segments equally broad; rest gradually tapering; tube about three-fifths as long as the head. Spines inconspicuous on first five segments, several light colored, long, knobbed, and several pointed spines on postero-lateral margin of segments 6, 7, 8, and 9, more numerous on the latter; tube with a whorl of terminal spines *about twice as long as the tube,* which is only slightly wider at the base than at the apex.

Described from one female specimen collected from an "emergence cage" used for the pear thrips (*Euthrips pyri* Daniel) at San Jose, Cal., 1910 (P. R. Jones).

Near *Anthothrips aculeatus* Fab., but differing in the italicized characters.

34. Genus CRYPTOTHRIPS Uzel.

KEY TO THE SPECIES.

a. Color dark yellowish brown, with no conspicuous purplish pigmentation; head slightly more than twice as long as wide; antennæ concolorous with head, except segment 2, which is yellowish brown, segment 3 brownish yellow, segment 4 light brown; postocular spines prominent, knobbed; ocelli not situated far forward ..... *Cryptothrips salicis* new species.

a′. Color brown to blackish brown, with conspicuous purplish pigmentation; segments 1 and 2 of antennæ concolorous with head, segment 3 and base of 4 yellow, others shading brown toward tip; postocular spines not long and prominent, blunt, not knobbed.... *Cryptothrips californicus* Daniel.

a″. Color uniformly coal-black, except tarsi, which are blackish brown.

b. Antennæ uniformly black; body length about 2.22 mm.; two pairs of prominent postocular spines..... *Cryptothrips carbonarius* Hood.

b′. General color of antennæ black, segment 2 paler at apex, segment 3 with two transverse, brownish-yellow bands, one band at the base and the other in the middle; body length about 2.7 mm.; without prominent postocular spines..... *Cryptothrips rectangularis* Hood.

DESCRIPTION OF NEW SPECIES.

Cryptothrips salicis new species. (Pl. VI, figs. 1–3.)

Measurements: Head, length 0.25 mm., width 0.11 mm.; prothorax, length 0.23 mm., width 0.35 mm. (including coxæ); mesothorax, width 0.33 mm.; abdomen, width 0.41 mm.; total body, length 1.7 mm.; length of tube 0.116 mm. Antennæ: Segment 1, 30μ; 2, 45μ; 3, 59μ; 4, 63μ; 5, 54μ; 6, 45μ; 7, 48μ; 8, 27μ; total length of antennæ, 0.37 mm.

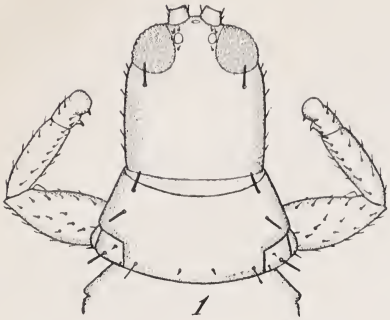
General color dark yellowish brown.

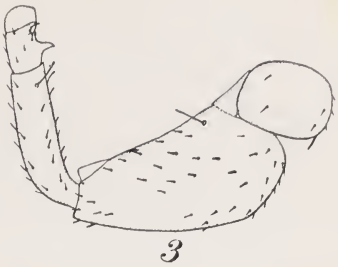
Head cylindrical, about twice as long as wide, somewhat prominent between the basal segments of the antennæ; sides nearly straight, roughened, not pilose, slightly converging posteriorly; head without conspicuous spines except a single prominent knobbed spine posterior to each eye; three small spines in front of and one behind each posterior ocellus. A set of three dark spots just posterior to the ocelli and arranged similarly.

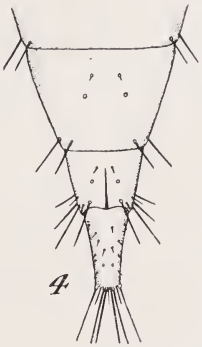
Eyes large, prominent, not protruding, not pilose; facets small, outer ones brownish yellow, remainder of eyes brownish black. *Ocelli* situated far forward; posterior ones contiguous to the inner margins of the eyes, a little proximal to the middle; anterior one not situated on extreme vertex but just distad of a line drawn through the extreme base of the first segments of the antennæ. *Mouth-cone* broad at the base, broadly rounded at the apex, short, extending only to about one-third the length of the prosternum; maxillary palpi quite long and slender. *Antennæ* 8-segmented, separated at the base by a slightly prominent vertex, unicolorous with head, except segment 2, which is yellowish brown, segment 3, which is *brownish yellow*, and segment 4, which is *light brown; segment 3 not noticeably weak.*

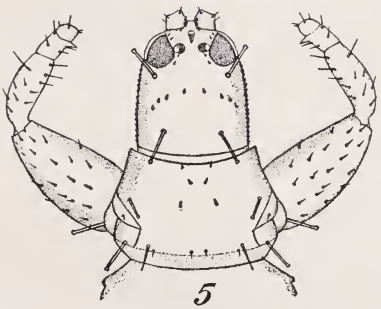
Prothorax large, about one-twelfth shorter than the head; sides straight, extending outward posteriorly; a short, knobbed spine on each anterior angle of prothorax and one long spine on posterior angle of prothorax; also one long spine at the middle of each coxa and one long spine on upper side of each coxa. *Pterothorax* considerably narrower than abdomen; sides almost straight, narrowed abruptly in front, gradually behind. *Legs* dark brown, thickly set with numerous short spines; tibiæ yellowish brown, short and stout; *front femora noticeably thickened;* fore coxæ greatly enlarged. *Wings fully developed,* extending to seventh abdominal segment, slightly narrowed in the middle; both pairs clear and with single fringe except four or five hairs near tip on fore wings, which are double-fringed.

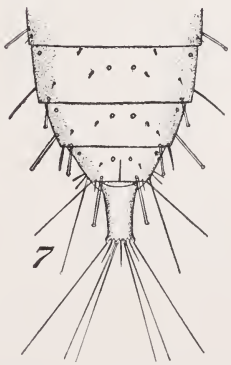
Abdomen long and robust, nearly two and one-half times as long as wide; sides nearly straight to segment 7, which is gradually narrowed; segments 8 and 9 abruptly narrowed; segment 10 (the tube)





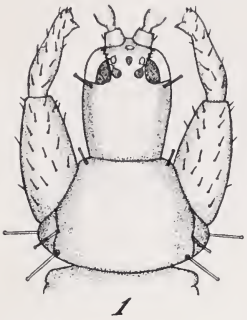


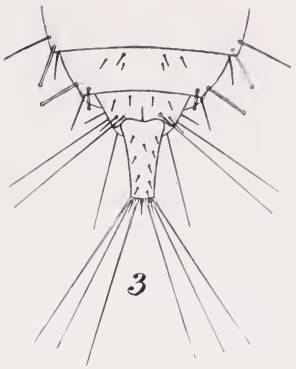


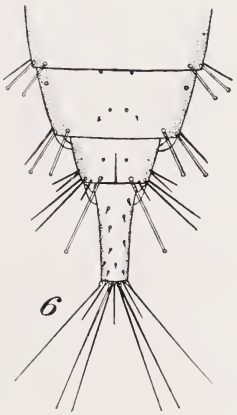


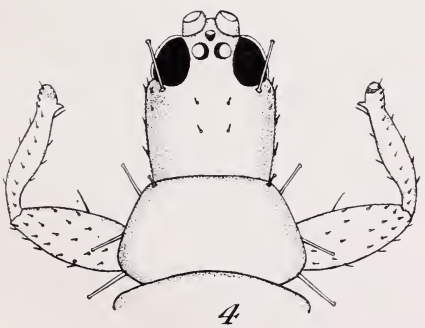
ANTHOTHRIPS.

Fig. 1.—*Anthothrips nigricornis:* Head and prothorax of female. Fig. 2.—*Anthothrips nigricornis:* Right antenna of female. Fig. 3.—*Anthothrips nigricornis:* Left foreleg of male. Fig. 4.—*Anthothrips nigricornis:* End of abdomen of female. Fig. 5.—*Anthothrips flavipes:* Head and prothorax of female. Fig. 6.—*Anthothrips flavipes:* Right antenna of female. Fig. 7.—*Anthothrips flavipes:* End of abdomen of female. Enlarged. (Original.)



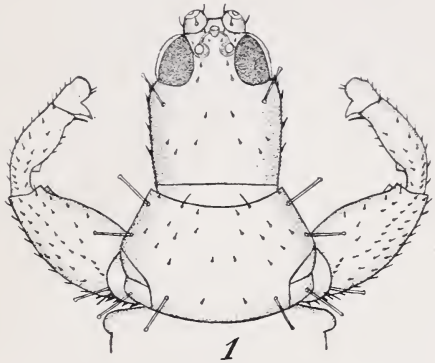


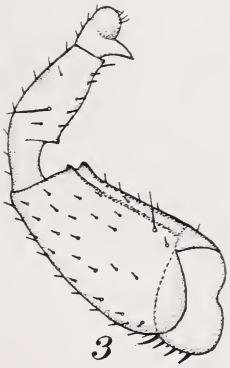


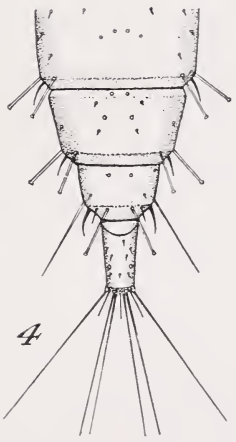


CRYPTOTHRIPS AND PHLŒOTHRIPS.

Fig. 1.—*Cryptothrips salicis:* Head and prothorax of female. Fig. 2.—*Cryptothrips salicis:* Left antenna of female. Fig. 3.—*Cryptothrips salicis:* End of abdomen of female. Fig. 4.—*Phlœothrips jennei:* Head and prothorax of female. Fig 5.—*Phlœothrips jennei:* Right antenna of female. Fig. 6.—*Phlœothrips jennei:* End of abdomen of female. Enlarged. (Original.)







PHLŒOTHRIPS.

Fig. 1.—*Phlœothrips armatus:* Head and prothorax of male. Fig. 2.—*Phlœothrips armatus:* Right antenna of male. Fig. 3.—*Phlœothrips armatus:* Left foreleg of male. Fig. 4.—*Phlœothrips armatus:* End of abdomen of male. Enlarged. (Original.)

small and slender, only a little narrower at the apex than at the base. A few nearly inconspicuous spines on posterior lateral margin of each segment, knobbed on first eight segments, with small pointed ones on segments 7 and 8; a whorl of six prominent spines on apex of tube.

Described from one female specimen reared from willow galls, San Jose, Cal., September 15, 1910 (J. R. Horton).

Near *Cryptothrips angustus* Uzel, but differing in the italicized characters.

37. Genus PHLŒOTHRIPS Haliday.

KEY TO THE SPECIES.

1. Postocular spines long and conspicuous.
   - *a*. Segment 3 of antennæ longer than segments 1 and 2 together.
     - *b*. Body color dark reddish brown; head nearly one and one-third times as long as wide; antennæ one and one-third times as long as the head. Segment 3 more than one and one-half times as long as segments 1 and 2 together; male unknown.....*Phlœothrips jennei* new species.
     - *b'*. Body color dark reddish brown; head slightly more than one and one-third times as long as wide; antennæ nearly one and one-half times as long as the head. Segment 3 about one and one-ninth times as long as segments 1 and 2 together; males with teeth at apex of fore femora. *Phlœothrips armiger* new species.
   - *a'*. Segment 3 of antennæ shorter than segments 1 and 2 together.
     - *b*. General color dark brown, tibiæ and tarsi bright yellow; cheeks nearly straight; antennæ one and three-fourths times as long as head; males with teeth at apex of fore femora.....*Phlœothrips uzeli* Hinds.
     - *b'*. General color brown, fore tibiæ and all tarsi light brown; cheeks strongly arched; antennæ one and one-half times as long as head; males with teeth at apex of fore femora.....*Phlœothrips raptor* Crawford.
   - *b''*. General color yellowish brown, with considerable irregular red hypodermal pigmentation, legs grayish brown; cheeks slightly arched; antennæ twice as long as the head; male unknown.....*Phlœothrips pergandei* Hinds.
2. Postocular spines wanting; general color dark mahogany brown, with many small white pigmental markings along head, thorax, abdomen, and legs. *Phlœothrips maculatus* Hood.

DESCRIPTION OF NEW SPECIES.

Phlœothrips jennei new species. (Pl. VI, figs. 4–6.)

Measurements: Head, length 0.31 mm., width 0.25 mm.; prothorax, length 0.18 mm., width 0.36 mm.; mesothorax, width 0.402 mm.; abdomen, width 0.43 mm.; length of tube, 0.2 mm. Antennæ: Segment 1, 22μ; 2, 31μ; 3, 80μ; 4, 80μ; 5, 67μ; 6, 54μ; 7, 52μ; 8, 33μ; total length of antennæ, 0.43 mm. Total length of body, 2.85 mm.

Color dark reddish brown, first seven segments of the abdomen lighter.

Head nearly one and one-third times as long as wide, rounded in front, widest at back of eyes, converging behind; frons protruding

quite prominently between the bases of the antennæ; cheeks arched, roughened, set with four spines on each side arising from quite prominent warts, the posterior pair the stoutest. *Eyes* medium in size, not prominent, with small facets; one pair of long, prominent, knobbed postocular spines. *Ocelli* large, distinct, subapproximate, the anterior one directed far forward; all ocelli reddish yellow, with dark red crescents. *Mouth-cone* long, sharply pointed, reaching to the base of the prosternum. *Antennæ* about one and one-half times as long as head; segment 3 about one and one-half times as long as segments 1 and 2 together; segments 3, 4, and 5 subequal in length, the remaining segments appearing smaller. Segments 1 and 2 dark reddish brown; segment 3 brownish white, darker at apex; segments 4, 5, and 6 darker, but lighter than segments 1 and 2, and lighter at the extremities than in the middle; segments 7 and 8 nearly as dark reddish brown as segments 1 and 2; spines long and conspicuous; sense-cones on segments 3, 4, and 5 stout and long.

Prothorax about twice as long as wide and a little more than one-half as long as the head, with long, dark colored, knobbed spines on the posterior and anterior angles, one pair midlatterally; also a pair on the fore coxæ. *Mesothorax* largest, wider than prothorax; *metathorax* tapering gradually to abdomen, which is abruptly wider. *Wings* slender, extending to middle of fifth abdominal segment, lightly infuscated with brown, with three long, knobbed spines on the anterior margin near the base of the fore pair of wings; both wings with a stripe in the center extending past the middle of the wings, the stripes brown in the posterior pair, transparent white in the anterior pair. *Legs* long and stout; fore femora greatly enlarged, with one long spine on the underside near the base; fore tarsi with a large tooth near the middle. Legs nearly uniform, dark reddish brown, except tarsi, which are light brownish white.

Abdomen large and slender, wider than pterothorax, almost equally wide but tapering slightly to the distal margin of the seventh segment; remaining segments tapering more abruptly; first seven segments lighter than rest of body; spines on segments one to eight knobbed, except one pointed spine on the postero-lateral margin of each segment. Tube slightly more than two-thirds as long as the head, with six long spines on the tip as long as the tube itself, and several short ones; several very small spines on the dorsal surface. Ninth abdominal segment with several long, pointed spines on the latero-dorsal posterior margin and one pair of knobbed spines.

Near *Phlœothrips minor* Uzel in the shape of the antennæ.

One female, collected May 9, 1910, on peach foliage at Barnesville, Ga. .(E. L. Jenne.)

Named for Mr. E. L. Jenne, of the Bureau of Entomology, who collected it.

Phlœothrips armiger new species. (Pl. VII, figs. 1–4.)

Measurements: Head, length 0.30 mm., width 0.23 mm.; prothorax, length 0.25 mm., width 0.41 mm.; mesothorax, width 0.41 mm.; abdomen, width 0.41 mm.; length of tube 0.15 mm. Antennæ: Segment 1, 18 μ; 2, 45 μ; 3, 72 μ; 4, 72 μ; 5, 60 μ; 6, 47 μ; 7, 45 μ; 8, 29 μ; total length of antennæ 0.39 mm. Total length of body 2.46 mm.

General color dark reddish brown, not so deep a reddish cast as in the former species.

Head slightly more than one and one-third times as long as wide; sides nearly straight; five warts on each side from each of which there arises a small spine, the posterior one the largest and stoutest; frons projecting considerably between the basal segments of the antennæ. *Eyes* medium in size, not prominent, with small facets; one pair of long, prominent, knobbed postocular spines. *Ocelli* large, distinct, subapproximate, reddish yellow, with dark-red crescents, the anterior one directed far forward. *Mouth-cone* long, sharply pointed, reaching to the base of the prosternum. *Antennæ* slightly more than one and one-half times as long as head; segment 3 about one and one-seventh times as long as segments 1 and 2 together; segments 1 and 2 dark reddish brown, remaining segments uniformly light brown, lighter at the bases and apices, segment 3 lighter than any of the segments; spines long, prominent, numerous; sense-cones not numerous except on segment 2, where the sense area is large and conspicuous and the sense-cones short and thick; several long sense-cones on segments 3, 4, and 5.

Prothorax about one and two-thirds times as wide as long and about five-sixths as long as the head, with long, dark-colored, knobbed spines on the posterior and anterior angles and one pair midlaterally; also one pair on the posterior margin just inside the pair on the posterior angles. Fore coxæ with a long knobbed spine on each coxa and also *armed with four short, very stout, pointed spines.* *Mesothorax* as wide as the prothorax at its anterior angles, abruptly tapering behind them. *Wings* long and slender, transparent, extending to distal margin of the fifth abdominal segment; three long knobbed hairs on the anterior margin of the fore-wings near the base; a very light brown stripe in the center of the posterior pair of wings extending slightly past the middle. *Legs* long and stout, densely spinose; fore femora greatly enlarged, one-half as wide as long. Fore legs evidently raptorial; fore femora with two sharp, toothlike projections at the tip, within, and a groove between them, evidently a sheath for the tibiæ; fore tibiæ with a small, anteriorly-directed tooth near the base within; fore tarsi with an immense tooth on the inner side; fore femora and fore tibiæ each with a long spine underneath, all other spines very

small. Femora and middle and posterior tibiæ concolorous with body; fore tibiæ and all tarsi light brownish yellow.

Abdomen long and slender, tapering gradually from the first segment. First eight segments with knobbed spines; one pair of knobbed spines on the ninth abdominal segment; segments 6, 7, and 8 with several pointed spines in addition to the knobbed spines; segment 9 with several long, pointed, curved spines on the posterior margin. Tube one-half as long as the head, with several small spines on the dorsal surface; 6 long spines, longer than the tube, on the dorsal and latero-dorsal margin; 1 short spine between the two long medio-dorsal spines; no scale at the base of the tube.

One male taken from gall on laurel leaves, Alum Rock Creek Canyon, San Jose, Cal., July 10, 1910 (P. R. Jones).

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